Amendments to the Claims

Please amend Claims 1-20, 28-32, 34, and 36-37. Please add new Claims 39-43. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

1. (Currently Amended) A gas ~~regulator~~ conserver for delivering gas to a patient from a pressurized storage container, comprising:

   a gas regulator for providing gas at a regulated pressure;

   a slave valve assembly coupled to the gas regulator for receiving and controlling the flow of the regulated gas to a ~~desired destination~~ patient passage;

   a timing chamber positioned adjacent to the slave valve assembly and coupled to the gas regulator, the timing chamber having an inlet for also receiving the regulated gas and an outlet to atmosphere; and

   an electronically operated pilot valve assembly in communication with the timing chamber for operating the slave valve assembly, when the pilot valve assembly is closed, gas pressure within the timing chamber acting on the slave valve assembly closes the slave valve assembly, and when the pilot valve assembly is open, gas exits the timing chamber through the outlet to atmosphere to reduce ~~reducing~~ the gas pressure in the timing chamber thereby allowing the slave valve assembly to open and deliver the regulated gas to ~~the desired destination~~ the patient passage.

2. (Currently Amended) The gas ~~regulator~~ conserver of claim 1 in which the slave valve assembly comprises a slave valve nozzle and a slave valve member for engaging the slave valve nozzle, the gas pressure within the timing chamber acting on the slave valve member controlling the operation of the slave valve member.

3. (Currently Amended) The gas ~~regulator~~ conserver of claim 2 in which the slave valve member is a diaphragm.

4. (Currently Amended) The gas ~~regulator~~ conserver of claim 3 in which the electronically operated pilot valve assembly includes a piezoelectric device.

5. (Currently Amended) The gas ~~regulator~~ conserver of claim 3 in which the electronically operated pilot valve assembly is a solenoid operated pilot valve assembly.

6. (Currently Amended) The gas ~~regulator~~ conserver of claim 5 in which the solenoid operated pilot valve assembly comprises:

   a pilot valve nozzle;

   a pilot valve member for engaging the pilot valve nozzle; and

   a solenoid for operating the pilot valve member.

7. (Currently Amended) The gas ~~regulator~~ conserver of claim 6 in which the solenoid operated pilot valve assembly further comprises a spring for biasing the pilot valve member towards the pilot valve nozzle to be normally closed.

8. (Currently Amended) The gas ~~regulator~~ conserver of claim 7 in which the pilot valve nozzle and the pilot valve member are aligned along a common axis, whereby the pilot valve member moves along the axis for engaging and disengaging from the pilot valve nozzle.

9. (Currently Amended) The gas ~~regulator~~ conserver of claim 8 in which the gas regulator, the slave valve assembly, the timing chamber and the solenoid operated pilot valve assembly are positioned within a common housing, the timing chamber and the pilot valve nozzle being connected by a passage therebetween.

10. (Currently Amended) The gas ~~regulator~~ conserver of claim 8 in which the slave and pilot valve nozzles each have an opening, the pilot valve nozzle opening being smaller than the slave valve nozzle opening for ~~minimizing~~ reducing the solenoid size and energy expended by the solenoid.

11. (Currently Amended) The gas ~~regulator~~ conserver of claim 10 ~~in which the slave and pilot valve nozzle openings are sized to provide at least about a 45:1 area and solenoid energy efficiency ratio~~ wherein the area of the slave valve nozzle opening is at least 45 times greater than the area of the area of the pilot valve nozzle opening.

12. (Currently Amended) The gas ~~regulator~~ conserver of claim 11 in which the slave valve nozzle opening is at least about 0.048 inches in diameter and the pilot valve nozzle opening is about 0.007 inches in diameter.

13. (Currently Amended) The gas ~~regulator~~ conserver of claim 1 in which the regulated gas is medical oxygen for delivery to a patient.

14. (Currently Amended) The gas ~~regulator~~ conserver of claim 13 further comprising a sensing circuit for sensing inhalation by the patient for controlling the electronically operated pilot valve assembly.

15. (Currently Amended) A ~~gas regulator~~ medical oxygen conserver for delivering medical oxygen to a patient, comprising:

a portable housing mountable to a portable oxygen storage tank;

a gas regulator within the housing for receiving medical oxygen from the storage tank and providing the medical oxygen at a regulated pressure;

a slave valve assembly positioned within the housing and coupled to the gas regulator for receiving and controlling the flow of regulated oxygen to a patient, the slave valve assembly having a slave valve nozzle and a slave valve member comprising a diaphragm for engaging the slave valve nozzle;

a timing chamber within the housing positioned adjacent to the slave valve member, the timing chamber having an inlet coupled to the gas regulator for also receiving the regulated oxygen and an outlet to atmosphere; and

a solenoid operated pilot valve assembly positioned within the housing and in communication with the timing chamber by a passage therebetween for operating the slave

valve assembly, the solenoid operated pilot valve assembly comprising a pilot valve nozzle, a pilot valve member for engaging the pilot valve nozzle, a solenoid for operating the pilot valve member, and a spring for biasing the pilot valve member towards the pilot valve nozzle such that the pilot valve assembly is normally closed, and when the pilot valve assembly is closed, oxygen pressure within the timing chamber acting on the slave valve member closes the slave valve assembly, and when the pilot valve assembly is open, oxygen exits from the timing chamber through the outlet to atmosphere to reduce ~~reducing~~ the oxygen pressure in the timing chamber thereby allowing the slave valve assembly to open and deliver the regulated oxygen to the patient, the slave and pilot valve nozzles each having an opening, the pilot valve nozzle opening being smaller than the slave valve nozzle opening for ~~minimizing~~ reducing the solenoid size and energy expended by the solenoid.

16. (Currently Amended) The ~~gas regulator~~ medical oxygen conserver of claim 15 in which the pilot valve nozzle and the pilot valve member are aligned along a common axis, whereby the pilot valve member moves along the axis for engaging and disengaging from the pilot valve nozzle.

17. (Currently Amended) The ~~gas regulator~~ medical oxygen conserver of claim 16 ~~in which the slave and pilot valve nozzle openings are sized to provide at least about a 45:1 area and solenoid energy efficiency ratio~~ wherein the area of the slave valve nozzle opening is at least 45 times greater than the area of the area of the pilot valve nozzle opening.

18. (Currently Amended) The ~~gas regulator~~ medical oxygen conserver of claim 17 in which the slave valve nozzle opening is at least about 0.048 inches in diameter and the pilot valve nozzle opening is about 0.007 inches in diameter.

19. (Currently Amended) The ~~gas regulator~~ medical oxygen conserver of claim 15 further comprising a sensing circuit for sensing inhalation by the patient for controlling the electronically operated pilot valve assembly.

20. (Currently Amended) A method of ~~regulating with a gas regulator~~ for conserving gas from a pressurized storage container for delivery to a patient, comprising:

from a gas regulator, providing gas at a regulated pressure;

receiving and controlling the flow of the regulated gas to a ~~desired destination~~ patient passage with a slave valve assembly coupled to the gas regulator;

~~positioning~~ operating a timing chamber adjacent to the slave valve assembly and coupled to the gas regulator, the timing chamber having an inlet for also receiving the regulated gas and an outlet to atmosphere; and

operating the slave valve assembly with an electronically operated pilot valve assembly which is in communication with the timing chamber, when the pilot valve assembly is closed, gas pressure within the timing chamber acting on the slave valve assembly closes the slave valve assembly, and when the pilot valve assembly is open, gas exits the timing chamber through the outlet to atmosphere to reduce ~~reducing~~ the gas pressure in the timing chamber thereby allowing the slave valve assembly to open and deliver the regulated gas to the ~~desired destination~~ patient passage.

21. (Original) The method of claim 20 in which the slave valve assembly comprises a slave valve nozzle and a slave valve member for engaging the slave valve nozzle, the method further comprising controlling the operation of the slave valve member with the gas pressure acting on the slave valve member.

22. (Original) The method of claim 21 further comprising forming the slave valve member from a diaphragm.

23. (Original) The method of claim 22 further comprising providing the electronically operated pilot valve assembly with a piezoelectric device.

24. (Original) The method of claim 22 further comprising forming the electronically operated pilot valve assembly as a solenoid operated pilot valve assembly.

25. (Original) The method of claim 24 further comprising providing the solenoid operated pilot valve assembly with: a pilot valve nozzle; a pilot valve member for engaging the pilot valve nozzle; and a solenoid for operating the pilot valve member.

26. (Original) The method of claim 25 further comprising biasing the pilot valve member towards the pilot valve nozzle with a spring to be normally closed.

27. (Original) The method of claim 26 further comprising aligning the pilot valve nozzle and the pilot valve member along a common axis, whereby the pilot valve member moves along the axis for engaging and disengaging from the pilot valve nozzle.

28. (Currently Amended) The method of claim 27 further comprising ~~positioning~~ operating the gas regulator, the slave valve assembly, the timing chamber and the solenoid operated pilot valve assembly within a common housing, the timing chamber and the pilot valve nozzle being connected by a passage therebetween.

29. (Currently Amended) The method of claim 27 further comprising providing the slave and pilot valve nozzles each with an opening, the pilot valve nozzle opening being smaller than the slave valve nozzle opening for ~~minimizing~~ reducing the solenoid size and energy expended by the solenoid.

30. (Currently Amended) The method of claim 29 ~~further comprising forming the slave and pilot valve nozzle openings to have sizes that provide at least about a 45:1 area and solenoid energy efficiency ratio~~ wherein the area of the slave valve nozzle opening is at least 45 times greater than the area of the area of the pilot valve nozzle opening.

31. (Currently Amended) The method of claim 30 ~~further comprising forming~~ wherein the slave valve nozzle opening ~~to be~~ is at least about 0.048 inches in diameter and the pilot valve nozzle opening ~~to be~~ is about 0.007 inches in diameter.

32. (Currently Amended) The method of claim 20 further comprising delivering medical oxygen to a patient.

33. (Original) The method of claim 32 further comprising sensing inhalation by the patient with a sensing circuit for controlling the electronically operated pilot valve assembly.

34. (Currently Amended) A method of ~~regulating~~ conserving medical oxygen with a medical oxygen ~~gas regulator~~ conserver comprising:

mounting a portable housing to a portable oxygen storage tank;

with a gas regulator within the housing, receiving medical oxygen from the storage tank and providing the medical oxygen at a regulated pressure;

receiving and controlling the flow of regulated oxygen to a patient with a slave valve assembly positioned within a housing and coupled to the gas regulator, the slave valve assembly having a slave valve nozzle and a slave valve member comprising a diaphragm for engaging the slave valve nozzle;

positioning a timing chamber within the housing adjacent to the slave valve member, the timing chamber having an inlet coupled to the gas regulator for also receiving the regulated oxygen and an outlet to atmosphere; and

operating the slave valve assembly with a solenoid operated pilot valve assembly positioned within the housing and in communication with the timing chamber by a passage therebetween, the solenoid operated pilot valve assembly comprising a pilot valve nozzle, a pilot valve member for engaging the pilot valve nozzle, a solenoid for operating the pilot valve member, and a spring for biasing the pilot valve member towards the pilot valve nozzle such that the pilot valve assembly is normally closed, and when the pilot valve assembly is closed, oxygen pressure within the timing chamber acting on the slave valve member closes the slave valve assembly, and when the pilot valve assembly is open, oxygen exits from the timing chamber through the outlet to atmosphere to reduce ~~reducing~~ the oxygen pressure in the timing chamber thereby allowing the slave valve assembly to open and deliver the regulated oxygen to the patient, the slave and pilot valve nozzles each having an opening, the

pilot valve nozzle opening being smaller than the slave valve nozzle opening for ~~minimizing~~ reducing the solenoid size and energy expended by the solenoid.

35. (Original) The method of claim 34 further comprising aligning the pilot valve nozzle and the pilot valve member along a common axis, whereby the pilot valve member moves along the axis for engaging and disengaging from the pilot valve nozzle.

36. (Currently Amended) The method of claim 35 ~~further comprising forming the slave and pilot valve nozzle openings to have sizes that provide at least about a 45:1 area and solenoid energy efficiency ratio~~ wherein the area of the slave valve nozzle opening is at least 45 times greater than the area of the area of the pilot valve nozzle opening.

37. (Currently Amended) The method of claim 36 ~~further comprising forming~~ wherein the slave valve nozzle opening ~~to be~~ is at least about 0.048 inches in diameter and the pilot valve nozzle opening ~~to be~~ is about 0.007 inches in diameter.

38. (Original) The method of claim 34 further comprising sensing inhalation by the patient with a sensing circuit for controlling the electronically operated pilot valve assembly.

39. (New) The conserver of Claim 1 wherein the patient passage is couplable to a single-lumen cannula.

40. (New) The method of Claim 20 further comprising coupling the patient passage to a single-lumen cannula.

41. (New) A method for fabricating a gas conserver for delivering gas to a patient from a pressurized storage container, comprising:

forming a coupling to a gas regulator for providing gas at a regulated pressure;

forming a slave valve assembly coupled to the gas regulator for receiving and controlling the flow of the regulated gas to a patient passage;

forming a timing chamber positioned adjacent to the slave valve assembly and coupled to the gas regulator, the timing chamber having an inlet for also receiving the regulated gas and an outlet to atmosphere; and

forming an electronically operated pilot valve assembly in communication with the timing chamber for operating the slave valve assembly, when the pilot valve assembly is closed, gas pressure within the timing chamber acting on the slave valve assembly closes the slave valve assembly, and when the pilot valve assembly is open, gas exits the timing chamber through the outlet to atmosphere to reduce the gas pressure in the timing chamber thereby allowing the slave valve assembly to open and deliver the regulated gas to the patient passage.

42. (New) A method of fabricating medical oxygen conserver for delivering medical oxygen to a patient, comprising:

forming a portable housing to mount to a portable oxygen storage tank;

installing a gas regulator within the housing for receiving medical oxygen from the storage tank and providing the medical oxygen at a regulated pressure;

positioning a slave valve assembly within the housing and coupled to the gas regulator for receiving and controlling the flow of regulated oxygen to a patient, the slave valve assembly having a slave valve nozzle and a slave valve member comprising a diaphragm for engaging the slave valve nozzle;

positioning a timing chamber within the housing adjacent to the slave valve member, the timing chamber having an inlet coupled to the gas regulator for also receiving the regulated oxygen and an outlet to atmosphere; and

positioning a solenoid operated pilot valve assembly within the housing and in communication with the timing chamber by a passage therebetween for operating the slave valve assembly, the solenoid operated pilot valve assembly comprising a pilot valve nozzle, a pilot valve member for engaging the pilot valve nozzle, a solenoid for operating the pilot valve member, and a spring for biasing the pilot valve member towards the pilot valve nozzle such that the pilot valve assembly is normally closed, and when the pilot valve assembly is closed, oxygen pressure within the timing chamber acting on the slave valve member closes

the slave valve assembly, and when the pilot valve assembly is open, oxygen exits from the timing chamber through the outlet to atmosphere to reduce the oxygen pressure in the timing chamber thereby allowing the slave valve assembly to open and deliver the regulated oxygen to the patient, the slave and pilot valve nozzles each having an opening, the pilot valve nozzle opening being smaller than the slave valve nozzle opening for reducing the solenoid size and energy expended by the solenoid.

43. (New) A gas conserver for delivering gas to a patient from a pressurized storage tank, comprising:

a patient passage for gaseously communicating with a patient through a single-lumen cannula;

a sensor circuit in gas communication with the patient passage for detecting an inhalation breath;

a gas regulator for providing a regulated supply of medical gas at a selected flow rate from a plurality of selectable flow rates;

a pneumatic slave valve assembly for controlling the delivery of the regulated medical gas from the gas regulator to the patient passage; and

an electronically-actuated pilot valve assembly responsive to the sensor circuit for controlling the operation of the slave valve assembly, wherein the slave valve assemble is operated in a conserving mode to deliver the medical gas at a calculated conserving ratio based on the selected flow rate and in a continuous mode to deliver the medical gas at a continuous flow equal to the selected flow rate.